

The New Hampshire Climate Change Policy Task Force

New Hampshire Climate Action Plan

*A Plan for New Hampshire's Energy, Environmental
and Economic Development Future*

**Appendix 4.10:
Develop an Integrated Education, Outreach,
and Workforce Training Program**

**Prepared by the
NH Department of Environmental Services
March 2009**

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RCI Action 4.6 - Develop an Overarching Outreach and Education Plan

Summary

The State of New Hampshire should implement a comprehensive climate change outreach and education program that elevates the awareness, knowledge and skill in the state in order to support action at all levels and in all sectors. This program would coordinate and develop educational programs in New Hampshire in order to engage residents, businesses and industry to take action now, while simultaneously expanding the capacity of the state to develop and implement advanced mitigation and adaptation solutions in a phased-in approach in the future. This broad education program must rely upon, and build partnerships with, existing educational and outreach organizations including (but not necessarily limited to) K-12 schools, colleges and universities, museums and science centers, environmental and climate change focused not-for-profits, state programs, and professional associations groups (e.g., architects, planners, builders). Critical to this effort would be marketing the existing Climate Action Plan in order to foster the support necessary for wide-spread implementation.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*):

This comprehensive outreach and education program would be developed for the entire state in order to raise the awareness, knowledge and technological sophistication to the level necessary to support efforts by New Hampshire residents, businesses and institutions to prepare for the current and future impacts of climate change while mitigating the most severe changes. This program would coordinate the implementation of the educational Actions already identified within the Climate Action Plan and identify, develop and implement any subsequent Actions that are deemed necessary to provide the public and private sectors with the awareness, knowledge and skills necessary to take immediate action while supporting research and innovation by academic institutions and for-profit entities that will devise the solutions necessary to achieve further greenhouse gas emission reductions and adapt to additional levels of climate change.

This education plan would require an inventory of the existing climate and energy related education, outreach and training programs and networks. A working group would be needed to consult with responsible parties and develop plan for enhancement, expansion, integration, and coordination of existing and future efforts in order to: disseminate the currently available information to the appropriate end-users; train the existing and future workforce enable the design, installation, operation and maintenance of energy efficiency and renewable energy resources; develop new opportunities and technologies most appropriate to New Hampshire; and distribute innovation when proven. The plan would identify the opportunities and necessary implementation strategies to provide the background to all New Hampshire residents, from the members of the public, to students, to local officials, to business leaders to integrate climate change action into all levels of decision making processes while also targeting education, training and research to prepare the next generation of skilled workers and leaders and develop the necessary technology.

This education program would be the critical bridge to the phase-in of more aggressive climate change action, be it adaptation or mitigation, in the future. Development of stable funding source to support a long-term, integrated program would be instrumental to its success.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):

- a. *Method of Establishment (e.g., legislation, executive order)*: This program would create partnerships between New Hampshire educators, energy efficiency, and environmental experts to identify and develop programs that target the knowledge and skills of New Hampshire residents related to climate change science, impacts and action. This could include materials and content for all academic levels, training for trade groups and professional organizations along with ongoing support.

The long-term goal of this program would be to integrate climate change adaptation and mitigation into required training and certification programs in order to institutionalize climate change action in all sectors and all levels. Finally, development of degree programs and research support is needed to ensure that the next generation of climate change leaders and technologies are being created within the state.

b. *Resources Required:*

- i. Partnership development would be required between state agencies, businesses and business groups, community-based organizations academic institutions, trade groups and professional societies, environmental organizations, and funding entities.
- ii. A comprehensive education plan would require funding for program development and implementation which would require staffing. Developing partnerships and building upon existing training programs could be an effective way to minimize costs. Potential grant funding may also be an option and to the extent that associate programming can be tied to direct reductions in energy, they may also be eligible for RGGI Fund monies.

c. *Barriers to Address (especially for medium to low feasibility actions):* This program would require significant effort to align multiple existing programs while developing new potential tracks which would require additional funds during a time of significant budget shortfall.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):

- a. *Parties Responsible for Implementation:* New Hampshire Department of Environmental Services, the Office of Energy and Planning, the Office of the Consumer Advocate, the NH Department of Education, University System of New Hampshire, the Energy Efficiency and Sustainable Energy Board, UNH Cooperative Extension, municipalities, school boards, non-profit organizations, technical schools, professional associations/professional organization training programs, museums and science centers, and the media.
- a. *Parties Paying for Implementation:* Grant making organizations, RGGI Fund and RPS Fund, and Core Program fund.
- b. *Parties Benefiting from Implementation:* All New Hampshire residents, current and future.

4. Related Existing Policies and Programs (*i.e., those that address similar issues without interacting*):

The New Hampshire Sustainable Energy Association (<http://www.nhsea.org>), Residential Energy Performance Association (<http://www.repa-nh.org>), and the American Council for an Energy Efficient Economy (<http://www.aceee.org/>), among others, include information resources regarding energy efficiency on their websites.

The New Hampshire Sustainable Energy Association's Consumer Guide (<http://www.nhsea.org/resources.php>) is an excellent resource for locating companies and organizations that offer sustainable energy products and services in New Hampshire.

[Google.org](http://www.google.org) is a potential resource for finding examples of existing broad-scope websites on energy efficiency and sustainable energy products and technologies.

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):

- a. *Existing*
- b. *Proposed:*
 - RCI Action 4.1 - Include Energy Efficiency and Conservation in School Curriculum;
 - RCI Action 4.2 - Increase Energy Efficiency through Building Management Education Programs;

- RCI Action 4.3 - Reduce Residential Energy Demand through Education and Outreach
- RCI Action 4.4 – Establish a Comprehensive Energy Efficiency and Renewable Energy Education Program
- RCI Action 4.5 – Create an Energy Efficiency and Sustainable Energy Systems Web Portal

6. Timeframe for Implementation:

- Identification of working group should begin immediately.
- Plan framework and development over the next year and initiate implementation in 2010.

7. Anticipated Timeframe of Outcome: 2009 and ongoing

Program Evaluation

1. Estimated CO₂ Emission Reduction: Supporting Action – Analysis not conducted.

- Short-term (2012)
- Mid-term (2025)
- Long-term (2050)

2. Economic Effects:

a. Costs:

- Implementation Cost:
- Timing:
- Impacts:

b. Savings:

- Potential Economic Benefit:
- Timing:
- Impacts:

3. Other Benefits/Impacts:

- Environmental:* In the longer term, this would reduce emissions of carbon dioxide, greenhouse gases, and other primary air pollutants in order to mitigate the effects of climate change and pollution of our ecosystems. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend.
- Health:* Human health benefits will be realized by decreasing exposure to toxic and hazardous pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days. Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease.
- Social:* Increased awareness and implementation of energy saving and sustainable generation efforts through public participation and education will alleviate climate change. However, methods of reducing energy and alternative generation technologies typically have short-term payback periods and can then provide savings for consumers and economic security for the State in the mid to long-term. By producing energy sustainably and domestically, the economy will benefit through increased jobs within the state.
- Other:* Secondary benefits include behavioral changes that improve environmental conditions in numerous areas (e.g., solid and hazardous waste reduction, reduced sprawl), inspiration of future

generation in development of alternative energy sources and technologies, preparation of future generation for participation and leadership in a wide variety of green businesses, and increased awareness in environmental impacts on health.

4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):
 - a. Technical: This is technically feasible and would require program development in order to implement.
 - b. Economic: This would be associated with an upfront cost but as an investment would have a net economic benefit over the long term through avoided costs as well as the economic development associated with innovation and technological advancement.
 - c. Statutory/Regulatory:
 - d. Social: There may be some resistance to additional programs that do not have an immediate direct benefit. The early emphasis on marketing the full Climate Action Plan and the need for early action to mitigate and adapt to climate change may be essential to address this issue.
5. Other Factors of Note:
6. Level of Group Interest:
7. References:

RCI Action 4.1 – Include Energy Efficiency and Conservation in School Curriculum

Summary

The existing K-12 school curriculum standards should be enhanced to promote the development of a citizenry that has a comprehensive understanding of the complex issues of climate change and the opportunities to engage in energy efficiency and conservation measures. Greenhouse gas emission reductions would be achieved as the students carry their growing knowledge of sustainable behavior back to their families and communities. Sustainable behaviors can happen as part of daily habits, life-long decisions, individual advocacy, and community involvement.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*): Short-term and long-term goals would be developed for education of New Hampshire's K-12 students on the subject of climate change and energy efficiency from a multi-disciplinary perspective, including topics in science, mathematics, and social studies. Goal development would be achieved through joint efforts of educators and experts on the environmental issues.
2. Implementation Plan (*i.e., how to implement the specific policy or program*):
 - a. Method of Establishment (*e.g., legislation, executive order*)
 - i. The short-term goal of this program would be to create partnerships between New Hampshire educators, energy efficiency, and environmental experts to establish a series of educator workshops to train New Hampshire teachers in the nuances of climate change education and the available energy efficiency and conservation methods that lead to environmental benefits including reductions in greenhouse gas emissions. These workshops would initially target those teachers in the participating school districts that routinely serve as "teacher leaders" and frequently drive curriculum development. By exploring classroom integration through their own curricula, these innovators would establish the pathways through which energy efficiency and conservation curriculum could be implemented district-wide. Continuing support would be offered to the teachers that completed the workshops for greater success in integration into the districts' curriculum requirements.
 - ii. The long-term goal of this program would be to amend the New Hampshire Curriculum Frameworks in all age categories to address specifically these goals with particular emphasis on curriculum for grades 9 to 12, including both open enrollment and advanced curricula. Such amendments are expected to require revisions to the focus of existing curriculum framework criteria, as well as increased specificity in science and social studies curriculum framework criteria.
 - b. Resources Required
 - i. Partnership development would be required and specific educator training workshops would need to be developed. Workshop topics/materials could be obtained from existing energy efficiency and conservation educator programs (such as those developed in Maine, etc.) The focus of these efforts would be on collaborative-teaming, rather than the creation of specific lessons. Targeted teacher leadership development on issues pertaining to climate change and energy efficiency would begin in a specific number of school districts per year. In addition, continued professional development and support would be offered to teachers who completed the workshops.

- ii. Opportunities and resources are to be made available in every New Hampshire school system for extracurricular activities that engage students to actively learn about climate change and energy efficiency issues, to develop skills required to meet challenges related to these issues (including life skills as well as skills needed by green business), and to affect positive behavioral changes. Programs are to be developed to challenge students and encourage competition between schools in greenhouse gas reduction initiatives by students and their families and communities. Support and leadership by teachers, parents, green businesses, and advocacy groups for programs at the school level (i.e., mentors and coaches) are to be sought. Training and educational materials for these supporters and leaders is to be developed and made readily available.
 - c. *Barriers to Address (especially for medium to low feasibility actions):* See Potential for implementation for an in depth review.
3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):
- a. *Parties Responsible for Implementation:* New Hampshire Department of Environmental Services, The Energy Efficiency and Sustainable Energy Board to be established by the Regional Greenhouse Gas Initiative, NH Board of Education, and NH school systems.
 - b. *Parties Paying for Implementation:* TBD
 - c. *Parties Benefiting from Implementation:* All NH students in K-12, and their families and communities
4. Related Existing Policies and Programs: TBD
5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):
- a. *Existing:* TBD
 - b. *Proposed:* TBD
6. Timeframe for Implementation: The development of multi-disciplinary teaching modules/workshops for educators should be achieved as soon as feasible (suggested target date of June 2010). Training in targeted communities/school districts would begin thereafter, continuing each year in different communities. Amendments of the New Hampshire Curriculum Frameworks and new teacher certification requirements would be a longer-term goal (suggested target date of June 2015). Conformance with new continuing education requirements is expected to require at least one additional year. Focus disciplines are expected to include science, social studies, and mathematics.
7. Anticipated Timeframe of Outcome: Mid- to long-term as the impacts of education will be realized throughout an individual's lifetime.

Program Evaluation

- 1. Estimated CO₂ Emission Reductions: This action not individually quantified.
- 2. Economic Effects
 - a. Costs:
 - i. Implementation Cost: Low (0-\$2.5 million)
 - ii. Timing: Constant / Even
 - iii. Impacts:

b. Savings:

- i. Potential Economic Benefit: Supporting mechanism only
- ii. Timing:
- iii. Impacts:

3. Other Benefits/Impacts:

- a. *Environmental*: In the longer term, this would reduce emissions of carbon dioxide, greenhouse gases, and other primary air pollutants in order to mitigate the effects of climate change and pollution of our ecosystems. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend.
- b. *Health*: Human health benefits will be realized by decreasing exposure to toxic and hazardous pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days. Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease.
- c. *Social*: Increased awareness and implementation of energy saving and sustainable generation efforts through public participation and education will alleviate climate change. However, methods of reducing energy and alternative generation technologies typically have short-term payback periods and can then provide savings for consumers and economic security for the State in the mid to long-term. By producing energy sustainably and domestically, the economy will benefit through increased jobs within the state.
- a. *Other*: Secondary benefits include behavioral changes that improve environmental conditions in numerous areas (e.g., solid and hazardous waste reduction, reduced sprawl), inspiration of future generation in development of alternative energy sources and technologies, preparation of future generation for participation and leadership in a wide variety of green businesses, and increased awareness in environmental impacts on health.

4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):

- a. *Technical*: The technical resources required already exist. Staff resources and materials will need to be addressed.
- b. *Economic*:
- c. *Statutory/Regulatory*:
- d. *Social*:

Existing curriculum frameworks provide a basis for future amendments. School curricula must meet federal requirements. Local educational resources and school day time allotments are restrictive. As such, curriculum amendments need to be comprehensive to address the complexity of climate change and energy efficiency issues, and, at the same time, to accommodate federal requirements and New Hampshire curriculum goals in all subjects without imposing unrealistic demands on resources and school day time allotments.

The New Hampshire Curriculum Frameworks are regularly reviewed and amended, and can be similarly reviewed and amended given new education goals pertaining to global warming and climate change.

A number of schools in New Hampshire have implemented multi-disciplinary programs on environmental issues. The educators responsible for these programs are a valuable resource for the development of new materials to meet new educational goals and curriculum amendments. Development of these new materials would require funding at a state level.

Teachers in focus disciplines may be reluctant to take part in continued development on issues that may, at first, appear to them to be unrelated to their subject area. Teachers of subjects that are not included in the focus disciplines are likely to resist what appears to them to be a reduction in focus in their study areas. As such, development of teachers in all subjects is necessary for the success of this program. All teachers would need to have a broad, generalized understanding of the issues of climate change and energy efficiency, and be given the opportunity to learn how these issues affect them and their students.

Multi-disciplinary programs require more communication and planning among teachers. Teachers in focus disciplines would need common planning periods. This need could pose a significant challenge to educational administrators. Employment of additional teachers would be necessary in some schools to enable scheduling common planning periods.

Limited programs and resources are currently available within New Hampshire schools for advanced study and extracurricular activities that engage students in climate change and energy efficiency issues. Existing programs and resources could be expanded, and new programs should be developed and implemented. Expanded and new programming would require resources not currently available. Recruitment and training of educators, parents, and other volunteer entities (e.g. Scouting, green businesses, global warming advocacy groups) would be needed.

5. Other Factors of Note: TBD
6. Level of Group Interest: High
7. References:

RCI Action 4.2 – Increase Energy Efficiency through Building Management Education Programs

Summary

The State of New Hampshire, energy utilities, and energy companies (such as oil and propane distributors) should continue and expand energy efficiency education for building maintenance and energy management staff. The industrial, small business, and government sectors should make use of the many training opportunities provided by utilities and private consulting firms to help with the identification of and continual improvement of building management best practices. Training should focus on energy audits as a proven method for identifying energy efficiency opportunities to minimize or eliminate net CO₂e output in existing buildings, while “beyond code” certification would assure that new buildings create the lowest possible environmental impact.

In addition, the state and its business organizations should promote the creation of building manager positions within companies and government agencies still without these positions. Furthermore, the concept of placing one person in charge of energy efficiency within an organization should be introduced to small businesses. This action would encourage regular reviews of energy use and identification and implementation of savings opportunities. Organizations should provide their energy managers with the responsibility and the budgetary tools necessary to implement energy saving measures and preventative maintenance programs that would reduce fossil fuel consumption and harmful emissions. These managers should have the ability to seek out grants and shared savings programs to reduce energy use and emissions.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*):

- a. Training: Improved knowledge of energy savings strategies would help reduce energy usage and/or displace existing energy resources with high-efficiency equipment and/or renewable fuels. To the extent economically feasible, program elements might include:

- i. Existing Buildings:

- Building operations management / commercial energy auditing*
- Operations and maintenance best practices*
- Retro-commissioning of buildings and equipment
- Energy audit training*
- US EPA benchmarking
- US EPA / US DOE Energy Star certification*
- Certified Energy Management (CEM) course*
- Mass-marketing campaign

*currently provided by electric and gas utilities, certain technical colleges, and/or the PUC

- ii. New Construction:

- Energy code training*
- Beyond code training*
- Beyond code audits / assistance*
- High-performance building practices* (e.g., Energy Star, LEED, New Buildings Institute)
- Commissioning of buildings (new and existing) and equipment
- US EPA benchmarking
- US EPA / US DOE Energy Star certification*
- Mass-marketing campaign

*currently provided by electric utilities and the PUC

- b. Energy Managers: The state (perhaps the Office of Energy and Planning, the Department of Environmental Services, or the Public Utilities Commission), acting either directly or in conjunction

with the energy utilities, should conduct a program to promote the creation of building energy manager positions within companies that have not already done so. Implementation of this program could also draw upon the resources and expertise of the Business and Industry Association and the local Chambers of Commerce. An effective building energy manager is one who can foster a corporate mentality that encourages energy efficiency in all aspects of a company's operations. Building managers can conduct regular reviews and audits of energy use and savings opportunities. They can also seek out grants from utilities and shared savings projects from energy service companies to make energy savings improvements. While the main focus of the program would be on mid-size and larger businesses, attention to energy efficiency would be beneficial to businesses of all sizes. Therefore, the concept of energy management should be introduced into even the smallest operations.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):

- a. *Method of Establishment* (e.g., legislation, executive order): The named agencies should work with the Energy Efficiency and Sustainable Energy Board (formed as a result of HB 1561) to review the funding opportunities and how a program might appropriately fit the organizations' responsibilities.
- b. *Resources Required*: Educational funding might come from the electric & natural gas utility conservation programs that are funded by the Systems Benefit Charge or from government sources. The program could be run through the state's business associations such as the Business and Industry Association or the local Chambers of Commerce.
- c. *Barriers to Address* (especially for medium to low feasibility actions): The most significant barrier to success of such a program might be institutional inertia where the corporate culture generally relegates building maintenance and management to a lower status than would be required to revolutionize the operations of businesses.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):

- a. *Parties Responsible for Implementation*: DES, OEP, and PUC would promote training opportunities and the creation of energy management positions. Currently, the electric CORE utilities conduct a variety of training classes including building manager certification and commercial auditor training for the private sector and government. The natural gas utilities are conducting specialty training on various aspects of energy efficient construction. New Hampshire's Community Colleges (MCC, LRCC) have programs on best building practices with a focus on energy. There are also other non-governmental organizations that have specialized energy efficiency expertise they are willing to share. They include the Community Action Program's Weatherization Offices, the Buildings Code Assistance Program, and many more.
- b. *Parties Paying for Implementation*: These programs are generally funded through Systems Benefit Charges and/or directly through tuition payments.
- c. *Parties Benefiting from Implementation*: Any business operating in New Hampshire, any homeowner or renter in New Hampshire.

4. Related Existing Policies and Program: Existing utility-run energy efficiency programs

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):

Proposed RCI Actions 1.1, Maximize Energy Efficiency in New Construction; 1.2, Maximize Energy Efficiency in Existing Residential Buildings; 1.3, Maximize Energy Efficiency in Existing Commercial, Industrial, and Municipal Buildings; 1.4.a, Upgrade Building Energy Codes; 1.4b, Improve Building Energy code Compliance; 1.5, Establish an Energy Properties Section in MLS Listings; 4.3 Reduce Residential Energy Demand through Education and Outreach; and 4.4, Establish a Comprehensive Energy Efficiency and Renewable Energy Education Program

6. Timeframe of Implementation: TBD. (There are 36,000 commercial or industrial establishments in New Hampshire.)
7. Anticipated Timeframe of Outcome: CO₂e reductions would begin to accrue immediately as each business implements improved practices.

Program Evaluation

1. Estimated CO₂ Emission Reductions: This action not individually quantified.
2. Economic Effects
 - a. Costs:
 - i. Implementation Cost: Moderately low (\$2.5 million to \$25 million)
 - ii. Timing: Immediate / higher initial costs
 - iii. Impacts: State government
 - b. Savings:
 - i. Potential Economic Benefit: Moderately high (\$125 million to \$500 million)
 - ii. Timing: Low short-term / mostly long-term
 - iii. Impacted: Business – evenly distributed
3. Other Benefits: *(non-carbon environmental benefits, etc)*
 - a. Environmental: This would reduce emissions of carbon dioxide, greenhouse gases, and other primary air pollutants in order to mitigate the effects of climate change and pollution of our ecosystems. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend. Potential benefits beyond CO₂e reductions include: water savings, reduced sewage
 - b. *Health*: Human health benefits will be realized by decreasing exposure to toxic and hazardous pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days. Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease.
 - c. Social: Additional jobs would be created (e.g., instructors, building energy managers) and cost savings would be realized due to reductions in energy use
 - d. Other:
4. Potential for Implementation *(i.e., including challenges, obstacles and opportunities)*:
 - a. *Technical*: There are no anticipated impediments.
 - b. *Economic*: The funding for energy efficiency programs is limited.
 - c. *Statutory/Regulatory*: There are no anticipated impediments.
 - d. *Social*: There are no anticipated impediments.
5. Other Factors of Note:

The Community Colleges already provide educational programs such as Building Construction Technology (Manchester) and Energy Services & Technology Program (Lakes Region).

There are several educational programs in place today available through the NHPUC and the electric and gas utilities, including a Commercial Energy Auditing Class, Certified Energy Manager Program, Operations & Maintenance Best Practices, and Energy Code and Beyond.
6. Level of Group Interest: High
7. References:

RCI Action 4.3 – Reduce Residential Energy Demand through Education and Outreach

Summary

New Hampshire should adopt a community-based educational outreach program aimed at reducing greenhouse gas (GHG) emissions in the residential sector. Residential GHG emissions account for roughly half of all greenhouse gas emissions, when personal vehicles are included; and an organized, concerted effort to engage residents in a voluntary reduction of their household energy consumption would be beneficial. Such a program would provide the information, tools, and support needed to enable households to understand how they use energy and map out a strategy to reduce their energy consumption. Emphasis should be placed on the financial savings achievable through home energy reduction. The program should make use of the various networks and communities of which residents are part (e.g., towns, neighborhoods, civic groups, faith-based organizations, businesses, environmental organizations) since these communities can encourage and support their members in making sustained, socially beneficial changes at the individual household level. To foster change at the household level, research-based behavioral change strategies that target the root causes of climate change inaction should be employed through a comprehensive system of outreach activities that strengthen communities and do not rely solely on information-based campaigns.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*): Emphasize the connection between household energy use, greenhouse gas emissions, and energy costs to encourage households to adopt changes that will reduce their environmental footprint and save them money. Provide the framework and tools for households to quantify their energy-related emissions and develop a strategy to reduce these emissions. Encourage greater participation by promoting the need for good stewardship of the Earth to protect the Earth's climate and resource availability for future generations.

Use a database to quantify emission reductions, participation rates, and chart progress toward achieving emission reduction goals and objectives. Link individual actions to community-based efforts to reduce emissions and produce a map showing the distribution of communities that are taking action (See Appendix A). Emphasize social aspects of community-based initiatives to inspire friendly competitions among communities, help make the behavior normative ("Our households are saving \$800 a year on our energy costs. Join us!") and boost participation rates. Encourage a prominent public display of the community's goal in energy reduction and progress toward reaching that goal.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):

- a. *Method of Establishment (e.g., legislation, executive order)*:

The state could adopt the New Hampshire Carbon Challenge (NHCC, <http://nhcarbonchallenge.org>) as a platform to reduce residential energy consumption and could issue an Executive Order to encourage all state employees to take the challenge and a call to action of New Hampshire citizens to do the same. Local energy committees, businesses, schools, faith-based organizations, and community organizations are terrific venues for disseminating the Carbon Challenge.

The New Hampshire Carbon Challenge is an innovative program that has adapted proven climate change communication techniques and research-based behavioral change strategies, which target the root causes of climate change inaction, to create a unique set of tools that support households and communities in reducing their GHG emissions. These tools emphasize the financial benefits associated with household energy conservation and efficiency and provide the means for households to map out a strategy to reduce their energy consumption and chart their progress toward achieving their goals. The NHCC also employs a comprehensive system of outreach activities which make use of the networks and communities (e.g., towns, neighborhoods, civic groups, faith-based organizations, businesses) since these communities are essential partners in creating sweeping and sustained reductions in energy usage at the household level.

Since October 2007, households in New Hampshire that have taken the New Hampshire Carbon Challenge have identified actions they are willing to take in their homes that will reduce their greenhouse gas emissions by an average of 17% and save them \$835 a year in energy costs.

- b. *Resources Required:* Some financial resources required for statewide implementation of outreach efforts and development of additional web-based tools to enable households to maximize their greenhouse gas reductions.
- c. *Barriers to Address (especially for medium to low feasibility actions):* Individual behavioral change is difficult and most campaigns to promote residential energy reduction only distribute information and therefore have limited impact. What's needed is an integrated, collaborative approach that strengthens communities, builds social capital, and gives residents incentives and recognition for making personal changes that yield major societal benefit.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):

- a. *Parties Responsible for Implementation:* NH DES and/or NH OEP in partnership with the New Hampshire Carbon Challenge.
- b. *Parties Paying for Implementation:* Current ratepayers
- c. *Parties Benefiting from Implementation:* All citizens of the state

4. Related Existing Policies and Programs:

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):

- a. *Existing:* Utility-sponsored efficiency programs funded through the SBC.
- b. *Proposed:* RCI Action 4.1, Include Energy Efficiency and Conservation in School Curriculum; RCI Action 4.2, Maximize Efficiency through Building Management Education Programs; RCI Action 4.5, Create an Sustainable Energy Systems Web Portal

6. Timeframe for Energy Efficiency and Implementation: Immediate and ongoing

7. Anticipated Timeframe of Outcome: 2008 and ongoing

Program Evaluation

1. Estimated CO₂ Emission Reductions: This action not individually quantified.

2. Economic Effects

a. Costs:

- i. Implementation Cost: Low (0-\$2.5 million)
- ii. Timing: Constant / even
- iii. Impacted: State government

b. Savings:

- i. Potential for Implementation: Supporting mechanism only
- ii. Timing:
- iii. Impacts: Consumer – evenly distributed

3. Other Benefits/Impacts:

- a. *Environmental:* Since half of all greenhouse gas emissions come from the residential sector, when personal vehicles are included, household energy reduction must be a critical component of any strategy to reduce greenhouse gas emissions.
- b. *Health:* The significant rise in extreme heat days (days in which temperatures exceed 90°F or 100°F) projected in this century is likely to increase the risk of heat stress, heat stroke, and heart attacks.

Warmer temperatures also encourage the breeding of disease carriers such as mosquitoes, ticks, and rodents. Curbing emissions is essential to protecting air quality and human health.

- c. *Social:* Household use of energy reflects deeply ingrained patterns of behavior, thus a sustained reduction in energy consumption is achievable only by altering these underlying behaviors (such as reducing unnecessary vehicle mileage, eliminating phantom load etc). These changes are difficult to make in isolation and are more likely to succeed if part of a larger community-wide effort. Residential outreach efforts should make use of existing networks and communities which can strengthen these communities and build social capital.

Reducing residential energy consumption also has a direct and immediate impact on reducing energy costs. The typical household in New Hampshire that has taken the New Hampshire Carbon Challenge has identified actions they are willing to take in their home that will reduce their emissions by 17% and save them \$835 a year in energy costs.

- d. *Other:* Emphasis on buying local to reduce transportation emissions benefits farmers markets and other local initiatives and creates demand for products made in New Hampshire.

Educating residents about energy consumption, climate impacts, and dollars saved is transferable knowledge that can benefit other sectors. For example, understanding the importance of using energy efficient lighting and reducing phantom load can lead to increased awareness of opportunities to conserve energy in businesses, schools and municipalities.

4. Potential for Implementation (i.e., including challenges, obstacles and opportunities):

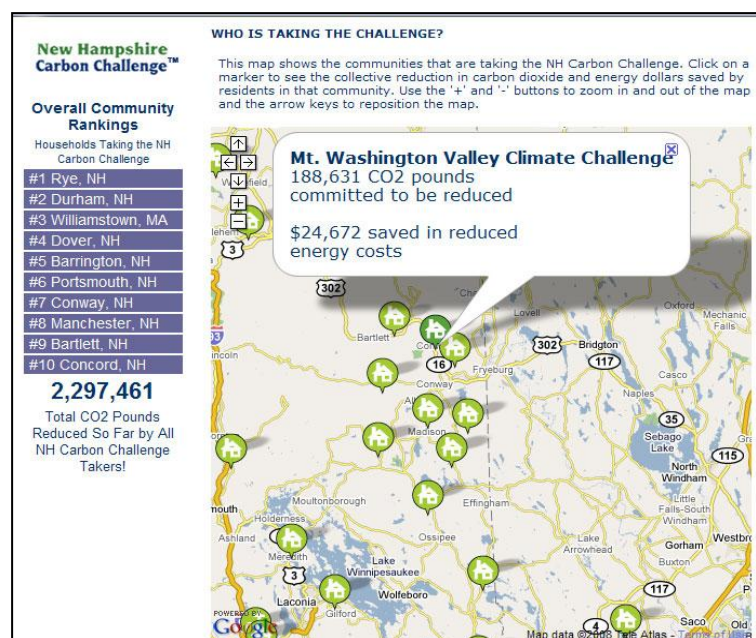
- a. *Technical:* There is an immediate potential for implementing this action as the technology is available and some of the work is already being done.
- b. *Economic:* Additional funding will be needed to sustain the program and enable the development of the appropriate self-sustaining social networks.
- c. *Statutory/Regulatory:*
- d. *Social:* There has been a positive response to this program and its message due the connection between climate change action, energy conservation and efficiency, and cost savings.

- 5. Other Factors of Note: No other environmental organization in New Hampshire focuses on the residential sector and has in place a comprehensive program to reduce household greenhouse gas emissions. A well designed residential outreach initiative creates demand for utility sponsored efficiency programs promoting energy efficient products and technologies.

- 6. Level of Group Interest: High

- 7. References:

Map of households taking the New Hampshire Carbon Challenge:
Using community-based initiatives and friendly competition to galvanize change in the household sector.



RCI Action 4.4 – Establish a Comprehensive Energy Efficiency and Renewable Energy Education Program

Summary

New Hampshire should establish a comprehensive Energy Efficiency and Renewable Energy Education Program serving all segments of building design, construction, sales, and ownership/maintenance. This program would provide accessible resources and educational opportunities to individuals and organizations who design, build, evaluate/rate, maintain, sell, own, and occupy buildings. The program would be established and administered at various settings throughout the state, including demonstration centers, community colleges, training seminars.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*):

There is a tremendous gap between knowledge and practice. It is estimated that just by using current technology efficiently and correctly we could cut building energy consumption and associated greenhouse gas emissions by 30 percent. In the proposed action, the state of New Hampshire, utility companies, colleges, professional and building trade organizations, etc. would sponsor ongoing training and offer demonstration sites for energy-efficient and renewable energy practices for architects, engineers, and homeowners. The program would provide training and support to builders, code officials, and energy raters, and would establish working groups for building managers and real estate agents.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):

- a. *Method of Establishment (e.g., legislation, executive order)*: The proposed action would create partnerships to establish comprehensive education and training programs for all segments of building design, construction, management, and ownership. Experience gained in the CORE Efficiency Programs could prove useful in implementing this action item. The most direct approach has been to offer targeted training seminars on a wide spectrum of energy efficiency topics at locations across the state. These seminars currently reach approximately 1,000 professionals and 10,000 school children each year. In addition, several education partnerships have been established. In one partnership with the Peabody Mills Environmental Center (PMEC), the local utility provided technical advice and incentives for improving the efficiency of the facility, and in return, the PMEC agreed to incorporate energy efficiency into their public education curriculum which they will be offering on an ongoing basis. In another example, the utility established a partnership with the statewide lodging and restaurant association. The association has used its contacts with its membership to conduct industry-specific training seminars and to introduce the members to the available efficiency audits and financial incentives offered through the CORE Programs.
- b. *Resources Required*: A comprehensive energy efficiency and renewable energy education program would require funding for staffing and setting up locations for training seminars. Developing partnerships and building upon existing training programs as described in 2.a above could be an effective way to minimize costs.
- c. *Barriers to Address (especially for medium to low feasibility actions)*:

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):

- a. *Parties Responsible for Implementation*: The NH Department of Environmental Services, other state agencies, the legislature, individual towns, the Lakes Region Community College, other community colleges, and New Hampshire's electric and gas utilities
- b. *Parties Paying for Implementation*: Potential grant funding.

- c. *Parties Benefiting from Implementation:* Builders, contractors, architects, code enforcement officers, building owners, and occupants.
4. Related Existing Policies and Programs: Existing utility-run energy efficiency programs.
5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):
 - a. *Existing:* TBD
 - b. *Proposed:*
 - RCI Actions 1.1 - Maximize Energy Efficiency in New Construction;
 - RCI Action 1.2 - Maximize Energy Efficiency in Existing Residential Buildings;
 - RCI Action 1.3 - Maximize Energy Efficiency in Existing Commercial, Industrial, and Municipal Buildings;
 - RCI Action 1.4.a - Upgrade Building Energy Codes;
 - RCI Action 1.4.b. - Improve Building Energy Code Compliance;
 - RCI Action 1.5 - Establish an Energy Properties Section in MLS Listings;
 - RCI Action 2.5 - Promote Net-Zero or Minimal-Emissions Industrial and Commercial Clusters;
 - RCI Action 4.1 - Include Energy Efficiency and Conservation in School Curriculum;
 - RCI Action 4.2 - Increase Energy Efficiency through Building Management Education Programs; and
 - RCI Action 4.3 - Reduce Residential Energy Demand through Education and Outreach
6. Timeframe for Implementation: Immediate and ongoing.
7. Anticipated Timeframe of Outcome: Benefits would accrue from initial educational offerings and would grow exponentially over time.

Program Evaluation

1. Estimated CO₂ Emission Reductions: This action not individually quantified.
2. Economic Effects
 - a. Costs:

i. Implementation Cost:	Moderately low (\$2.5 million to \$25 million)
ii. Timing:	Immediate / higher upfront
iii. Impacts:	State government
 - b. Savings:

i. Potential Economic Benefit:	Moderate (\$25 million to \$125 million)
ii. Timing:	Low short-term / mostly long-term
iii. Impacts:	Business – evenly distributed
3. Other Benefits/Impacts:
 - a. *Environmental:* This would reduce emissions of carbon dioxide, greenhouse gases, and other primary air pollutants in order to mitigate the effects of climate change and pollution of our ecosystems. This would lead to improved air and water quality directly as well as have more indirect effects on the fish and wildlife and the ecosystems upon which they depend.

- b. *Health:* Human health benefits will be realized by decreasing exposure to toxic and hazardous pollutants, many of which may have an effect that is exacerbated by the increase in hot summer days. Avoiding the impacts of air pollution can reduce the incidence of cardiac and respiratory disease.
 - c. *Social:* Increased awareness and implementation of energy saving and sustainable generation efforts through public participation and education will alleviate climate change. However, methods of reducing energy and alternative generation technologies typically have short-term payback periods and can then provide savings for consumers and economic security for the State in the mid to long-term. By producing energy sustainably and domestically, the economy will benefit through increased jobs within the state.
 - d. *Other:* Supporting renewables and conservation lowers the amount of greenhouse gases emitted into the atmosphere, reduces the load on our aging and maximized infrastructure, and creates a demand for alternative technologies in the U.S. marketplace.
4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):
- a. *Technical:* This type of program currently exists at the Lakes Region Community College. Further implementation of this action would involve creating additional partnerships to expand upon the current program.
 - b. *Economic:*
 - c. *Statutory/Regulatory:*
 - d. *Social:*
5. Other Factors of Note: Lakes Region Community College has submitted an NSF grant proposal to establish a comprehensive energy efficiency and renewable energy education center. In addition, there are tremendous resources and opportunities to create partnerships with business and industry.
6. Level of Group Interest: Medium
7. References:

RCI Action 4.5 – Create an Energy Efficiency and Sustainable Energy Systems Web Portal

Summary

The state should develop a searchable, web-based clearinghouse to hasten the adoption of energy efficiency and sustainable energy products and technologies. The portal would serve a range of specific New Hampshire audiences including local energy committees, city and town managers, business owners, industrial and commercial facility managers, and residents. The portal would provide each specific target audience with the resources needed to make informed decisions concerning the available options to reduce their greenhouse gas emissions (e.g., currently available products/services/technologies, costs, projected savings, installers or contractors, online calculators, and tax and/or rebate incentives). Although numerous websites have information of this sort, there is currently no web-based clearinghouse for those who are evaluating purchasing sustainable energy products and technologies or are have decided to buy products or services and need additional information.

Program Description

1. Mechanism (*i.e., how the policy or program achieves the desired result*):

The state would issue an RFP to create a searchable, web-based clearinghouse for energy efficient products and services. NHDES or NH Office of Energy and Planning would guide the development of this web portal, with assistance and input from organizations that have expertise in energy efficiency in the residential, commercial, and industrial sectors (in particular, the Jordan Institute, New Hampshire Sustainable Energy Association, Residential Energy Performance Association, and New Hampshire Carbon Challenge).

The portal would include links to related Internet sites and would also house and maintain a local, searchable database. The database would offer flexible search capabilities, allowing users to search on multiple keywords, conduct a free text search, select only those fields in the database of interest to them, or narrow their search in some manner (e.g., “solar electric installers in Merrimack or Hillsborough counties”). To facilitate the growth of this web portal, an on-line form would be developed allowing users to input new records into the database (records would be reviewed prior to being publicly available).

Potential database fields include:

- Description of the product/service/technology
- Cost
- Projected savings
- Contact information for distributors and/or installers of the product/service/technology
- Municipal, state, and federal tax or rebate incentives available
- Financing options (as banks and other lenders make capital available for sustainable energy projects)
- A list of local homes, businesses, schools, or municipalities that have purchased the product, are located near the person using the portal, and are willing to be contacted for more information about the product.

2. Implementation Plan (*i.e., how to implement the specific policy or program*):

- a. *Method of Establishment (e.g., legislation, executive order)*: The proposed web portal could be added to existing programs and resources supported by state agencies.
- b. *Resources Required*: A coordinator to determine the look and feel of the portal and the structure of the database (relevant fields) and to compile, and maintain (keep current) records in the database. Frequent updating is essential as energy efficiency is a rapidly changing field and new resources are often available. The coordinator will also work closely with the state and partner organizations in

developing the web portal as well as the programmer who will create the portal and related web systems.

- c. *Barriers to Address (especially for medium to low feasibility actions):* The portal would need to be heavily advertised (through multiple networks) so that businesses, energy committees, and homeowners would be aware of this resource.

3. Parties Affected by Implementation (*i.e., residents, businesses, municipalities, etc.*):

- a. *Parties Responsible for Implementation:* NHDES or NH Office of Energy and Planning
- b. *Parties Paying for Implementation:* Funding could be derived in part from existing and proposed energy efficiency and renewable funding mechanisms.
- c. *Parties Benefiting from Implementation:* All New Hampshire residents and business owners.

4. Related Existing Policies and Programs:

The New Hampshire Sustainable Energy Association (<http://www.nhsea.org>), Residential Energy Performance Association (<http://www.repa-nh.org>), and the American Council for an Energy Efficient Economy (<http://www.aceee.org/>), among others, include information resources regarding energy efficiency on their websites.

The New Hampshire Sustainable Energy Association's Consumer Guide (<http://www.nhsea.org/resources.php>) is an excellent resource for locating companies and organizations that offer sustainable energy products and services in New Hampshire.

[Google.org](http://www.google.org) is a potential resource for finding examples of existing broad-scope websites on energy efficiency and sustainable energy products and technologies.

5. Complementary Policies (*i.e., those that achieve greater reductions through parallel implementation*):

- b. *Existing*
- c. *Proposed:*
 - RCI Action 4.1 - Include Energy Efficiency and Conservation in School Curriculum;
 - RCI Action 4.2 - Increase Energy Efficiency through Building Management Education Programs;
 - RCI Action 4.3 - Reduce Residential Energy Demand through Education and Outreach
 - RCI Action 4.4 – Establish a Comprehensive Energy Efficiency and Renewable Energy Education Program
 - RCI Action 4.5 – Create an Energy Efficiency and Sustainable Energy Systems Web Portal

6. Timeframe for Implementation: 2008 and ongoing

7. Anticipated Timeframe of Outcome: 2008 and ongoing

Program Evaluation

1. Estimated CO₂ Emission Reductions: This action not individually quantified.

2. Economic Effects

a. Costs:

- i. Implementation Cost: Low (0-\$2.5 million)
- ii. Timing: Constant / even
- iii. Impacts: State government

b. Savings:

- i. Potential Economic Benefit: Supporting mechanism only
- ii. Timing:
- iii. Impacts:

3. Other Benefits/Impacts:

- a. *Environmental*: The web portal is intended to help consumers, businesses, and municipalities reduce their energy consumption. Reducing energy related greenhouse gas emissions is a critical component of any strategy to stabilize our climate.
- b. *Health*: The dramatic rise in extreme heat days (days in which temperatures exceed 90°F or 100°F) projected in this century will likely increase the risk of heat stress, heat stroke, and heart attacks. Warmer temperatures also encourage the breeding of disease carriers such as mosquitoes, ticks, and rodents. Curbing emissions is critical to protecting air quality and human health.
- a. *Social*: Increased awareness and implementation of energy saving and sustainable generation efforts through public participation and education will alleviate climate change. However, methods of reducing energy and alternative generation technologies typically have short-term payback periods and can then provide savings for consumers and economic security for the State in the mid to long-term. By producing energy sustainably and domestically, the economy will benefit through increased jobs within the state.
- c. *Other*: Supporting renewables and conservation lowers the amount of greenhouse gases emitted into the atmosphere, reduces the load on our aging and maximized infrastructure, and creates a demand for alternative technologies in the U.S. marketplace.

4. Potential for Implementation (*i.e., including challenges, obstacles and opportunities*):

- a. *Technical*: Developing a web portal on energy efficiency is technically feasible with sufficient web developer and IT personnel resources.
- b. *Economic*: Additional funding may be need for the staff time required to develop and maintain a comprehensive and accurate site.
- c. *Statutory/Regulatory*:
- d. *Social*: There is expected to be a high degree of public support as this information is already desired and requested explicitly.

5. Other Factors of Note:

6. Level of Group Interest: Low - medium

7. References: